

CLAIMS

1. A work arrangement apparatus for arranging plate-shaped works in such a manner that the plate-shaped works are piled up being interposed between interlayer sheets, said apparatus comprising:

a work conveyance belt for intermittently transporting said works, one by one;

a first air-suction unit for sucking with air said works to said work conveyance belt;

an interlayer sheet conveyance belt for intermittently transporting said sheets, one by one, said interlayer sheet conveyance belt being arranged to cross with said work conveyance belt;

a second air-suction unit for sucking with air said sheets to said interlayer sheet conveyance belt;

controlling unit for controlling said first and second air suction units in such a manner that said respective sheet is removed from said interlayer sheet conveyance belt to be sucked to said work conveyance belt to be attached to said respective work at a cross position of said work conveyance belt and said interlayer sheet conveyance belt, and both said work and said sheet are removed from said work conveyance belt at a work arrangement position, so that said works are piled up being interposed between said sheets.

2. An apparatus as set for claim 1, wherein a horizontal work feeding direction of said work conveyance belt is perpendicular to a horizontal sheet feeding direction of said interlayer sheet conveyance belt.

3. An apparatus as set for claim 2, wherein said work conveyance belt is placed above said sheet conveyance belt and is an endless belt having a lower path and an upper path so that said work is air-sucked to a lower face of the lower path thereof, and said sheet conveyance belt is also an endless belt having a lower path and an upper path so that said sheet is air-sucked to an upper face of the upper path thereof, in such a

manner that said respective sheet is removed from said upper path of the interlayer sheet conveyance belt to be sucked to said lower path of the work conveyance belt to be attached to said respective work at said cross position, and both said work and said sheet are removed from said lower path of the work conveyance belt at a work arrangement position, so that said works are piled up being interposed between said sheets.

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4. An apparatus as set for claim 1, wherein said first air-suction unit comprises a plurality of air suction boxes continuously arranged along a work feeding direction of said work conveyance belt, and said respective air suction boxes can be individually ON-OFF controlled, by said controlling unit, in such a manner that the air suction box placed at said work arrangement position is turned-off to remove both said work and said sheet from said work conveyance belt, so that said works are piled up being interposed between said sheets.

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5. An apparatus as set for claim 4, wherein said plurality of air suction boxes are continuously arranged at a first predetermined pitch, and said work conveyance belt intermittently feeds said respective works in the work feeding direction for a distance corresponding to said first predetermined pitch.

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6. An apparatus as set for claim 1, wherein said work conveyance belt is provided with a plurality of unit air-suction regions continuously and repeatedly arranged along the work feeding direction at a first predetermined pitch by which said work conveyance belt intermittently transports said works, each of said unit air-suction region comprises at least first and second sub-regions, said first sub-region comprise a plurality of relatively larger apertures for sucking a relatively smaller work and said second sub-region comprise a plurality of relatively smaller apertures for sucking a relatively larger work.

7. An apparatus as set for claim 4 further

comprising:

a detecting unit for detecting whether said respective work is allowable or defective, said detecting unit being placed in a work conveying area by said work conveyance belt; and

a defect recovery unit comprising one of said air suction boxes arranged at a recovery position, and a defect recovery box, in such a manner that the air suction box placed at said recovery position is turned-off to remove said defective work to put said defective work into said defect recovery box in accordance with a result of said the detecting unit.

8. An apparatus as set for claim 1 further comprising:

a cutting unit for cutting an elongated plate-shaped work into a predetermined length of individual plate-shaped works, said unit being placed in front of said work conveyance belt;

a gripper for gripping said individual plate-shaped works after having been cut; and

a lifter for lifting said plate-shaped work which is brought to a predetermined lifting position by said gripper so that the work is picked up with suction air to said work conveyance belt.

9. An apparatus as set for claim 1, wherein said second air-suction unit comprises a plurality of air suction boxes continuously arranged along a sheet feeding direction of said sheet conveyance belt, and said respective air suction boxes can be individually ON-OFF controlled by said controlling unit, in such a manner that the air suction box placed at said cross position is turned-off to remove said respective sheet from said interlayer sheet conveyance belt to be attached to said respective work.

10. An apparatus as set for claim 9, wherein said plurality of air suction boxes are continuously arranged at a second predetermined pitch, and said sheet

conveyance belt intermittently feeds said respective sheet in the sheet feeding direction for a distance corresponding to said second predetermined pitch.

5 11. An apparatus as set for claim 1, wherein said plate-shaped work is provided with at least a part thereof through which suction air is leaked, so that said interlayer is sucked to said work conveyance belt and attached to said work sheet by an action of air leaked through said work.

10 12. An apparatus as set for claim 1, wherein said plate-shaped work is a lead frame.

13. A work arrangement apparatus for arranging plate-shaped works in such a manner that the plate-shaped works are piled up being interposed between interlayer
15 sheets, said apparatus comprising:

a work conveyance belt for intermittently transporting said works, one by one;

a first air-suction unit for sucking with air said works to said work conveyance belt;

20 an interlayer sheet conveyance belt for intermittently transporting said sheets, one by one, said interlayer sheet conveyance belt being arranged to cross with said work conveyance belt;

25 a second air-suction unit for sucking with air said sheets to said interlayer sheet conveyance belt;

a controlling unit for controlling said first and second air suction units in such a manner that said respective work is removed from said work conveyance belt to be sucked to said sheet conveyance belt to be
30 attached to said respective sheet at a cross position of said work conveyance belt and said interlayer sheet conveyance belt, and both said work and said sheet are removed from said sheet conveyance belt at a work arrangement position, so that said works are piled up
35 being interposed between said sheets.

14. An apparatus as set for claim 13, wherein said interlayer sheet is provided with at least a part thereof

through which suction air is leaked, so that said work can be sucked to said sheet conveyance belt and attached to said sheet by the action of air leaked through said sheet.